

PE Yield with PPO

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Affect of using RPI PPO vs Ukraine PPO on PE yield

From Minfang - measurements of the absorbance vs. wavelength using a 10 cm cell for GdLAB and LAB with RPI PPO or Ukraine PPO added

used these measurements to get attenuation length for use in simulation to see the change in the pe yield due to PPO

Absorbance and Attenuation Length

$$A = -\log_{10}(I/I_0)$$

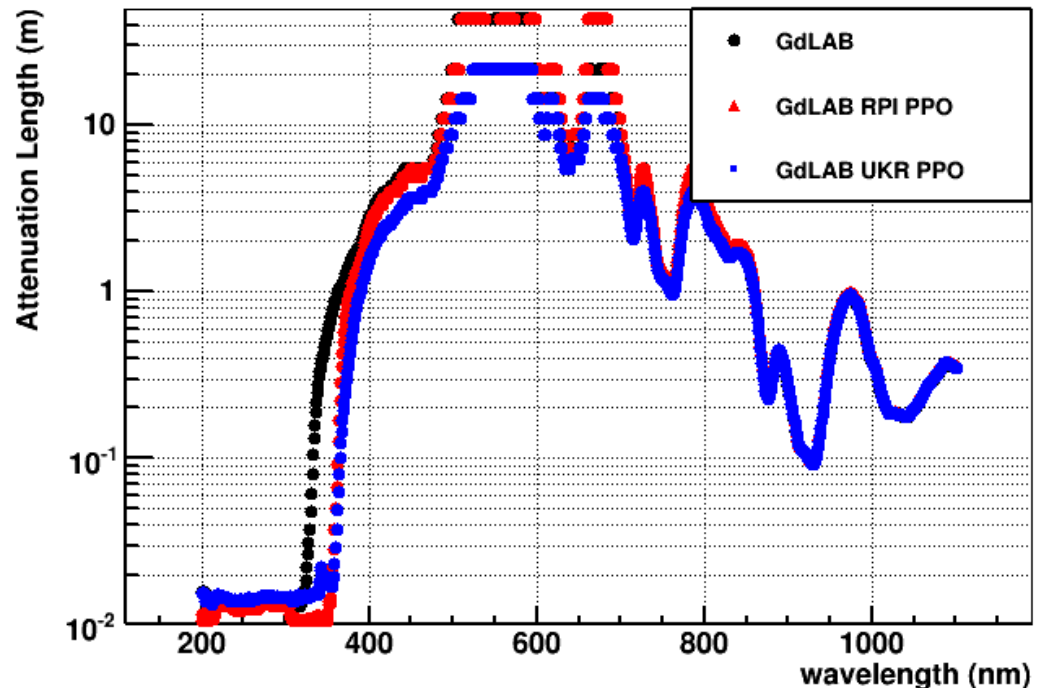
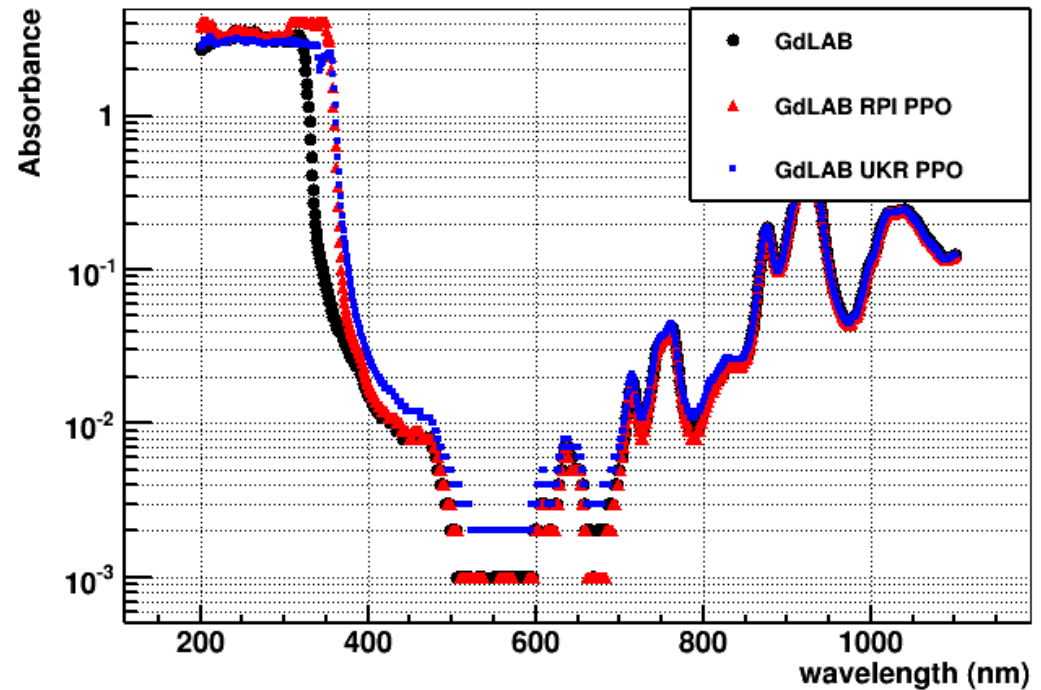
$$I = I_0 e^{-x/L(\lambda)}$$

$$x = 0.1 \text{ m (10 cm cell)}$$

$$L(\lambda) = 0.1/\ln(10^A)$$
$$= 0.04343/A$$

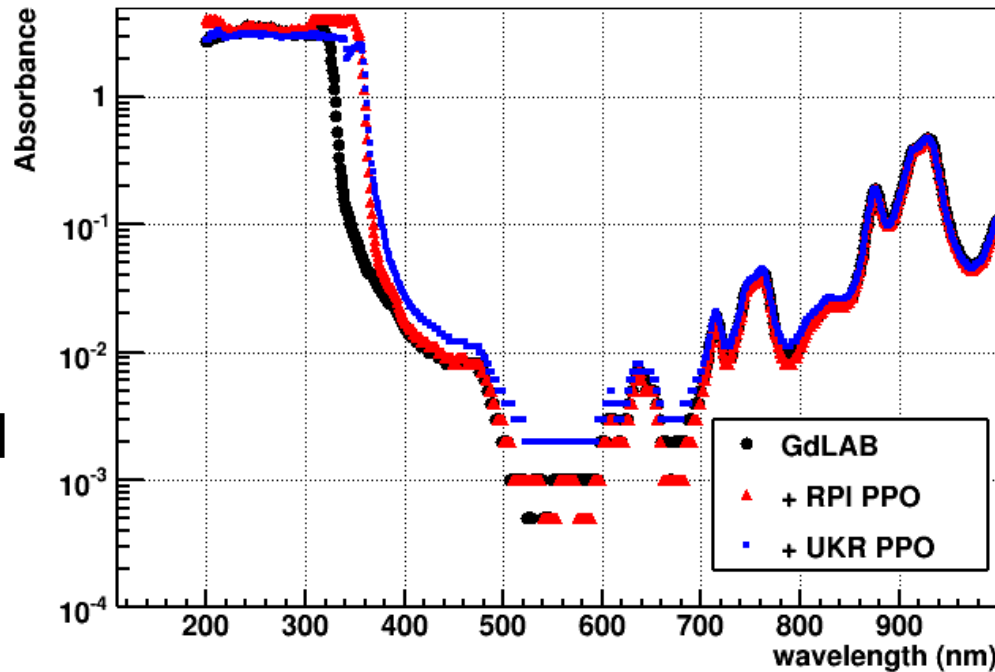
there are some $A=0$, which means $L = \text{infinite}$

I changed $A=0$ to $A=0.0005$
(precision of the data is 0.001)



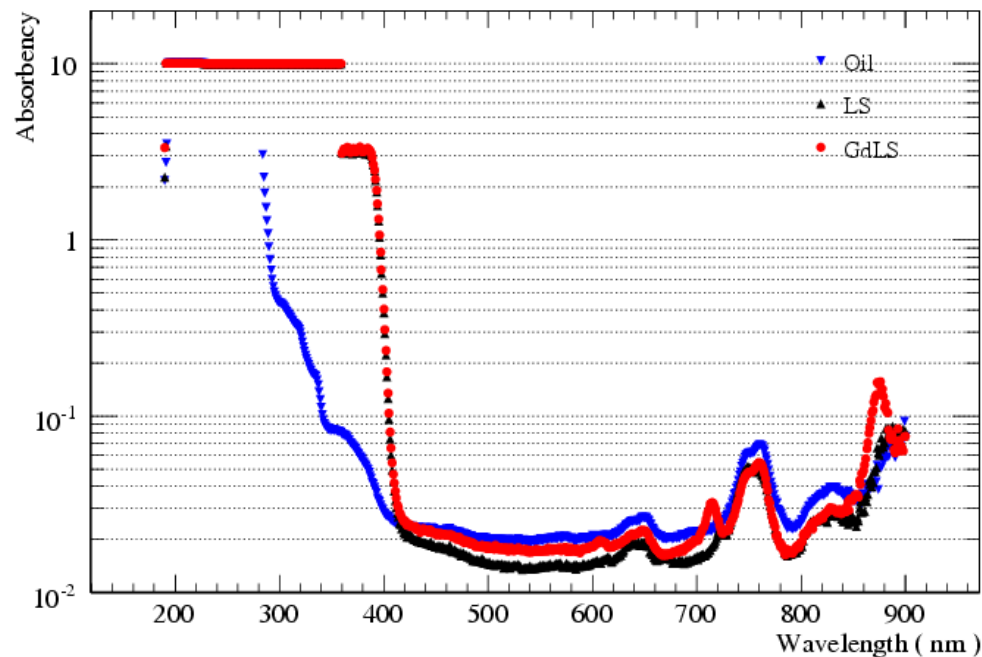
Should note that these measurements don't look like previous measurements (that current simulation is based on)

Weili took this spectrum, found attenuation length, then scaled up by a factor of $13.7/2$ (normalizing to 1 m tube measurement at 440 nm)



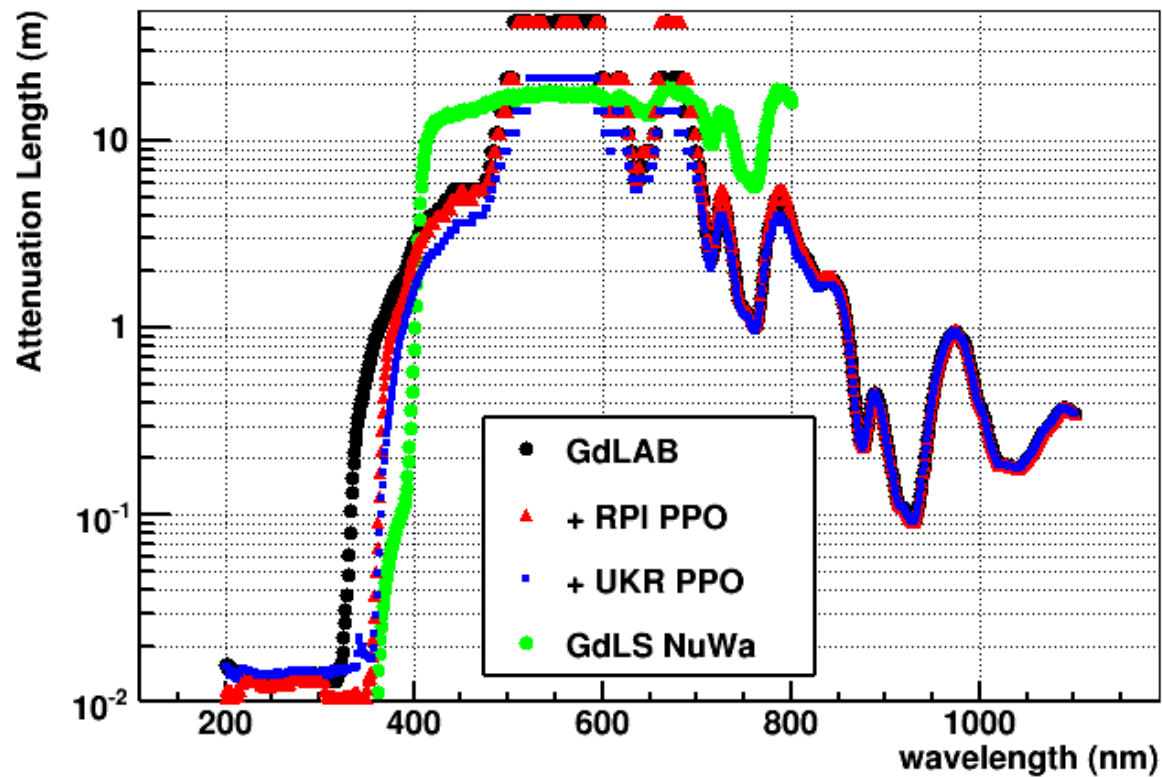
Minfang's measurements

look at **black**

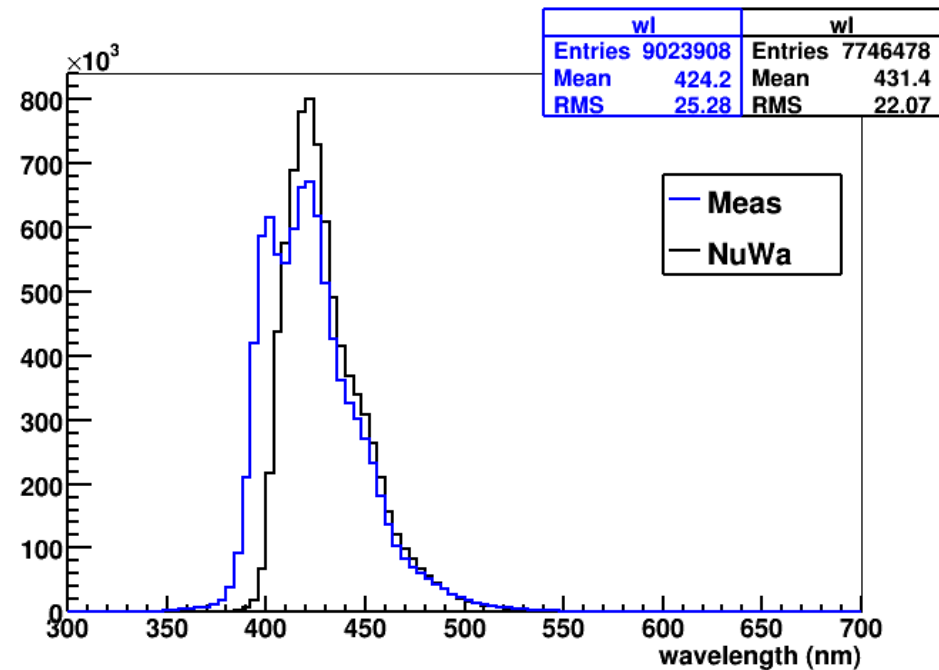


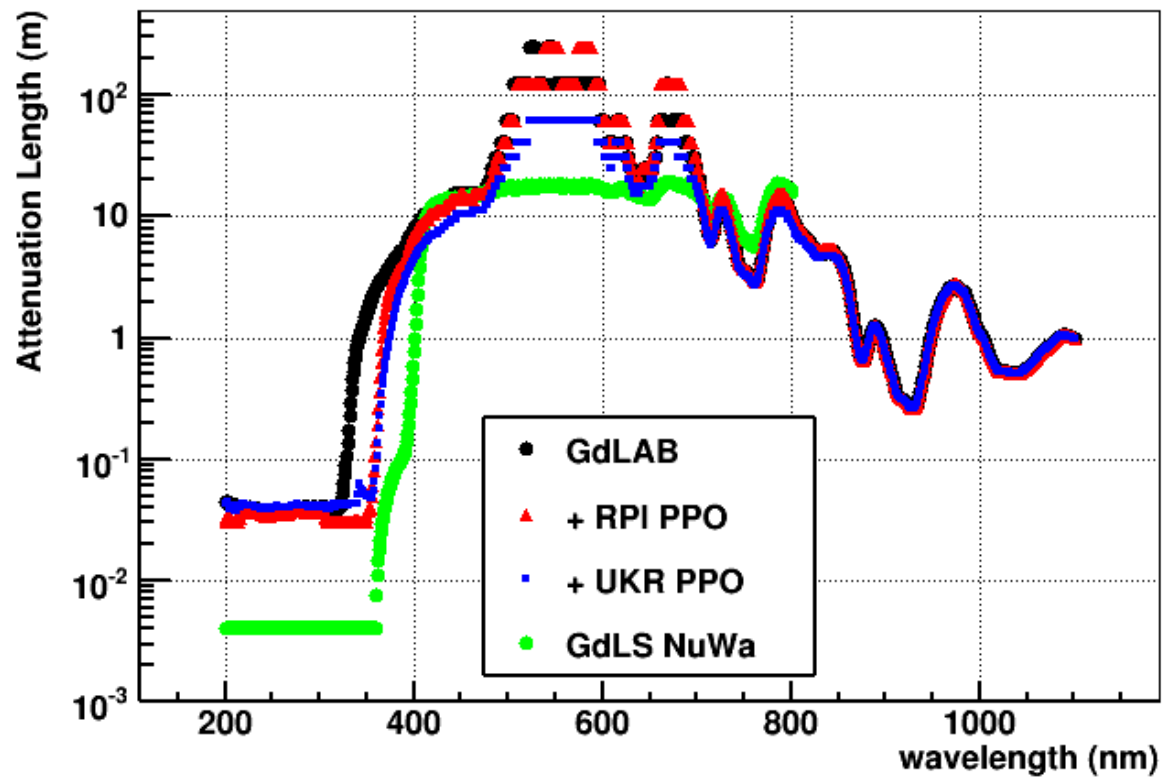
Weili's measurements (after a correction for reflection)

look at **red**

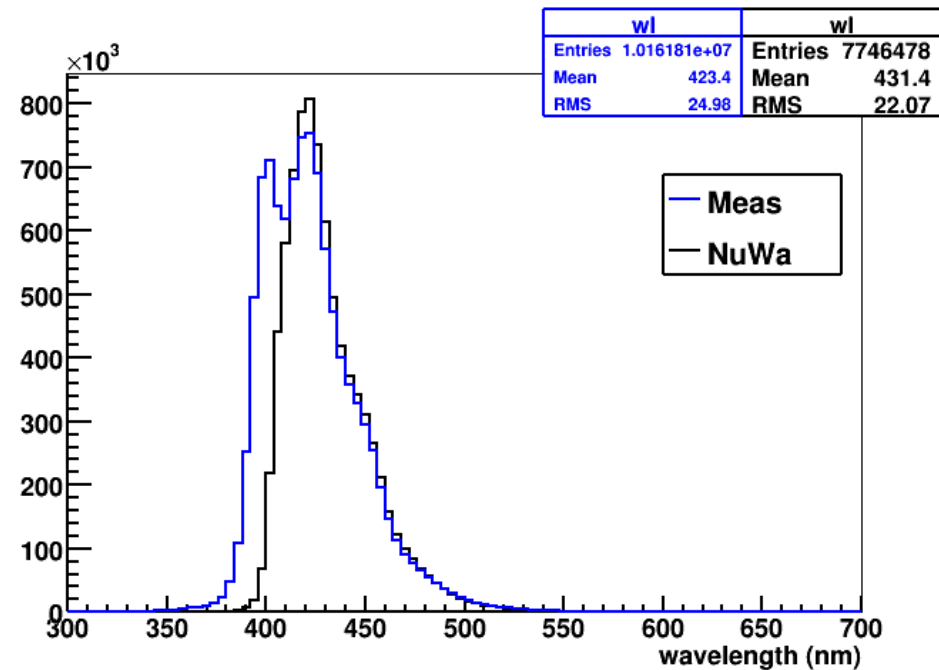


from Minfang's
 measurements
 NOT normalizing
 to 1 m tube
 measurement
 compared to
 current
 simulation



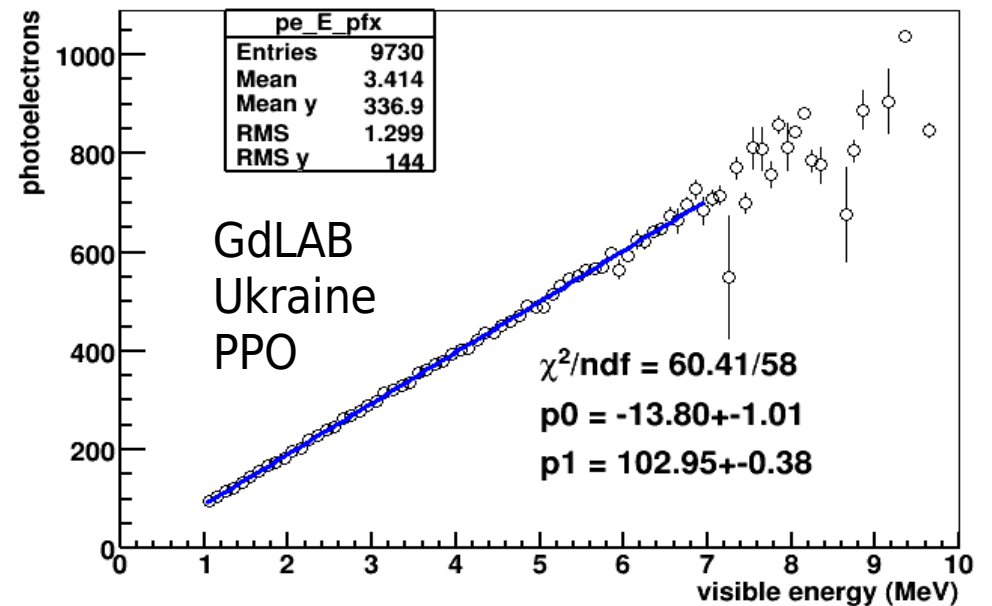
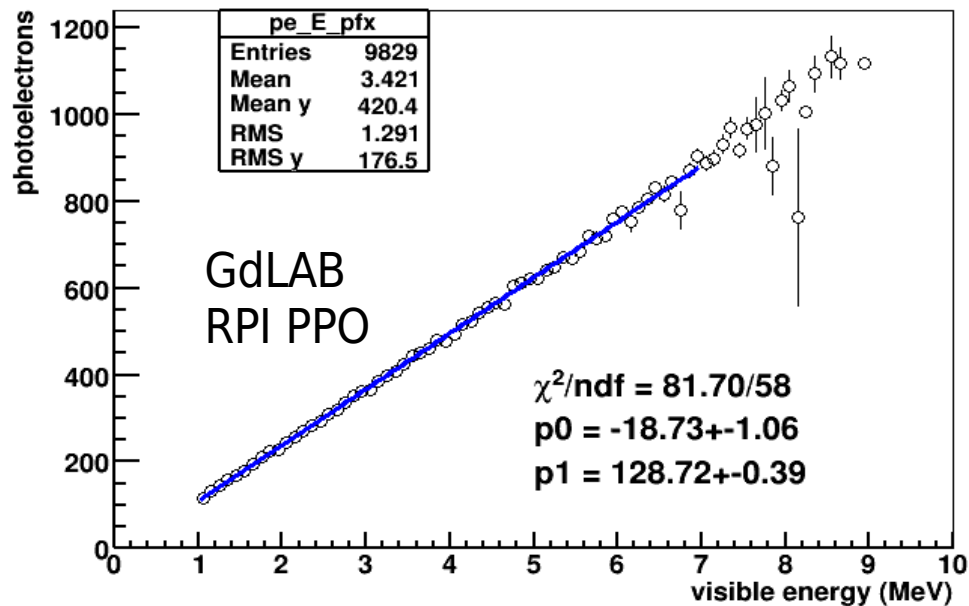
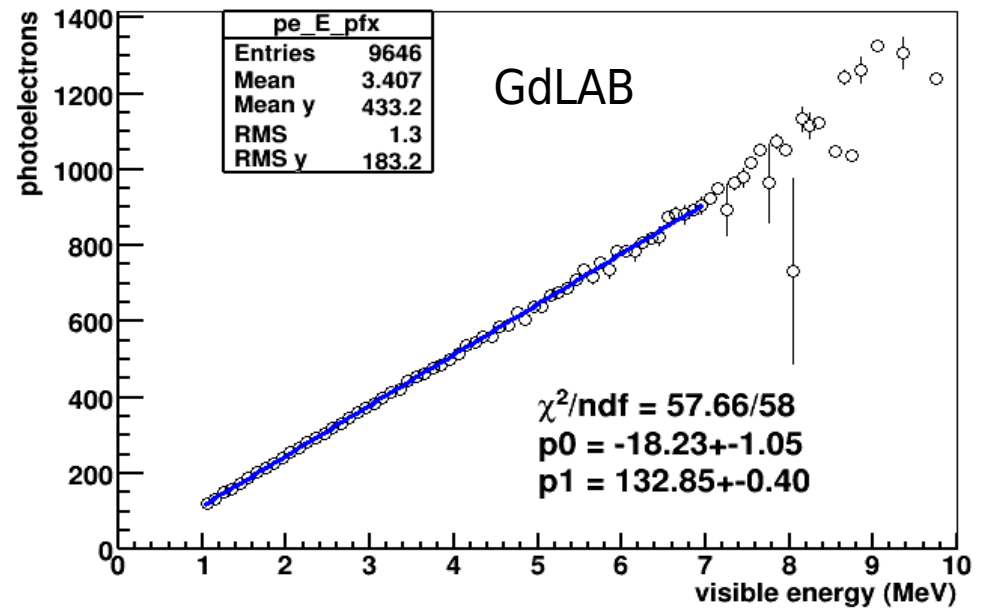


from Minfang's
 measurements
 normalizing to 1 m
 tube measurement
 compared to current
 simulation



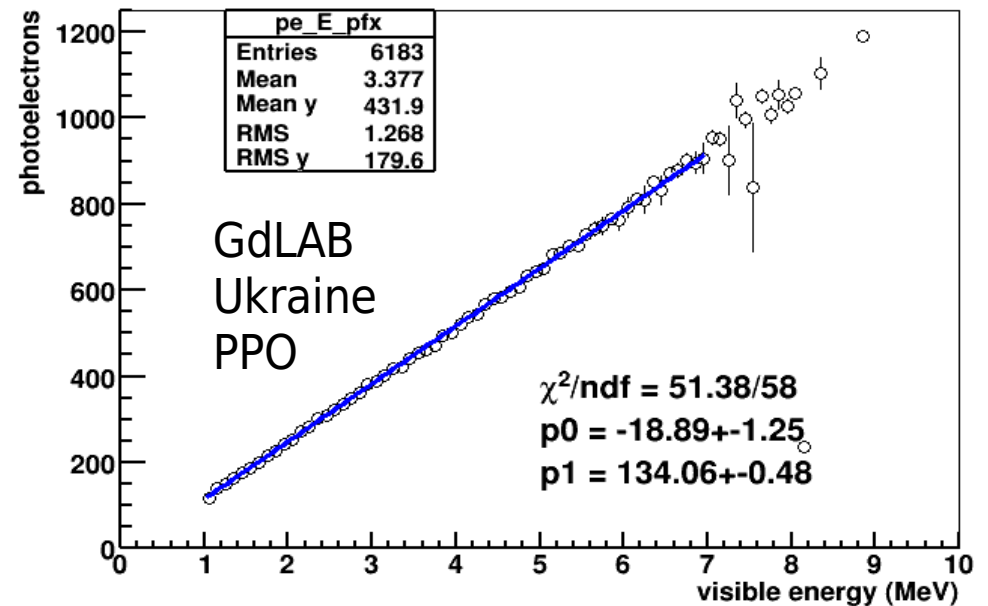
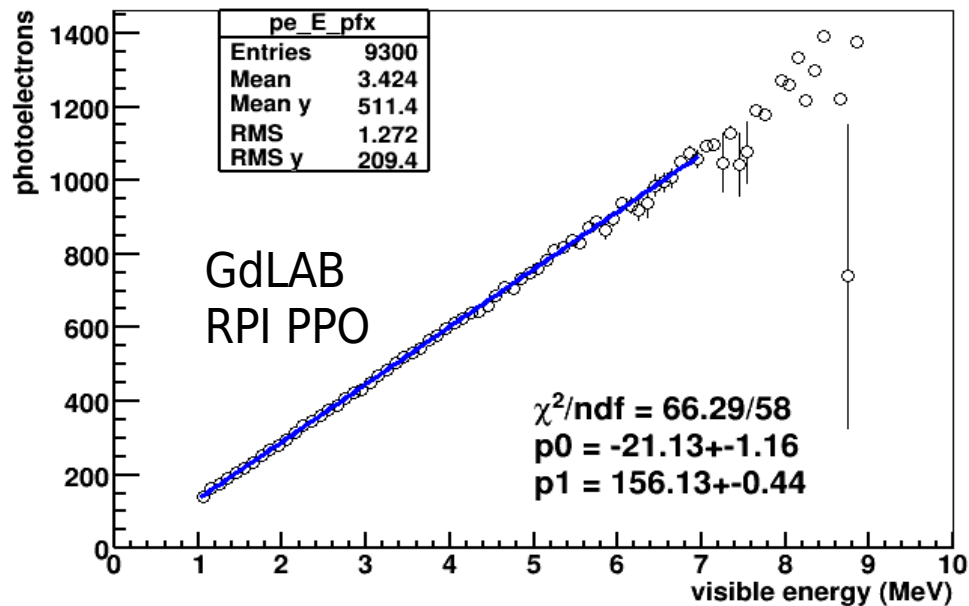
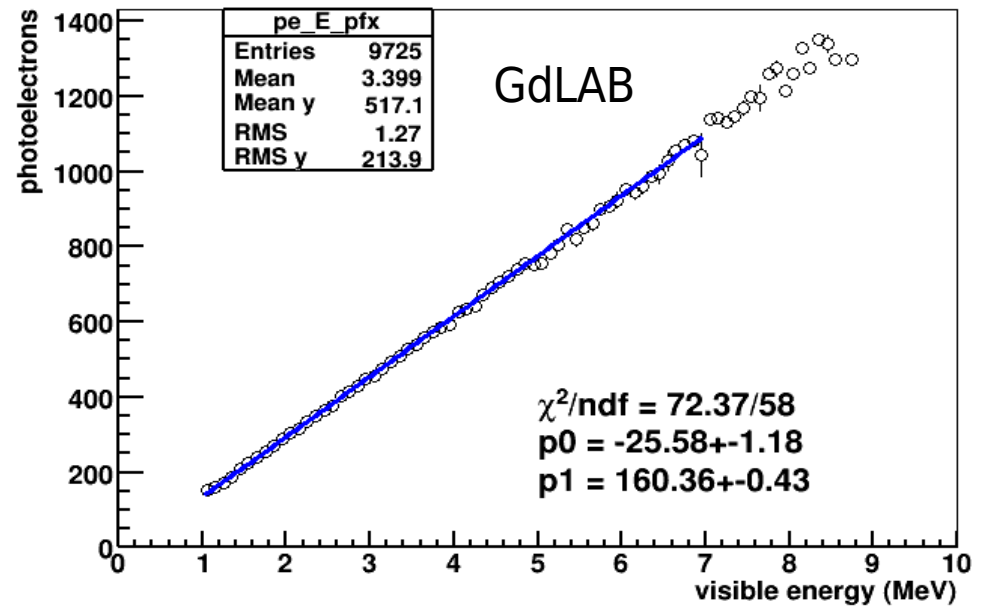
results NOT
normalizing to 1
m tube meas.

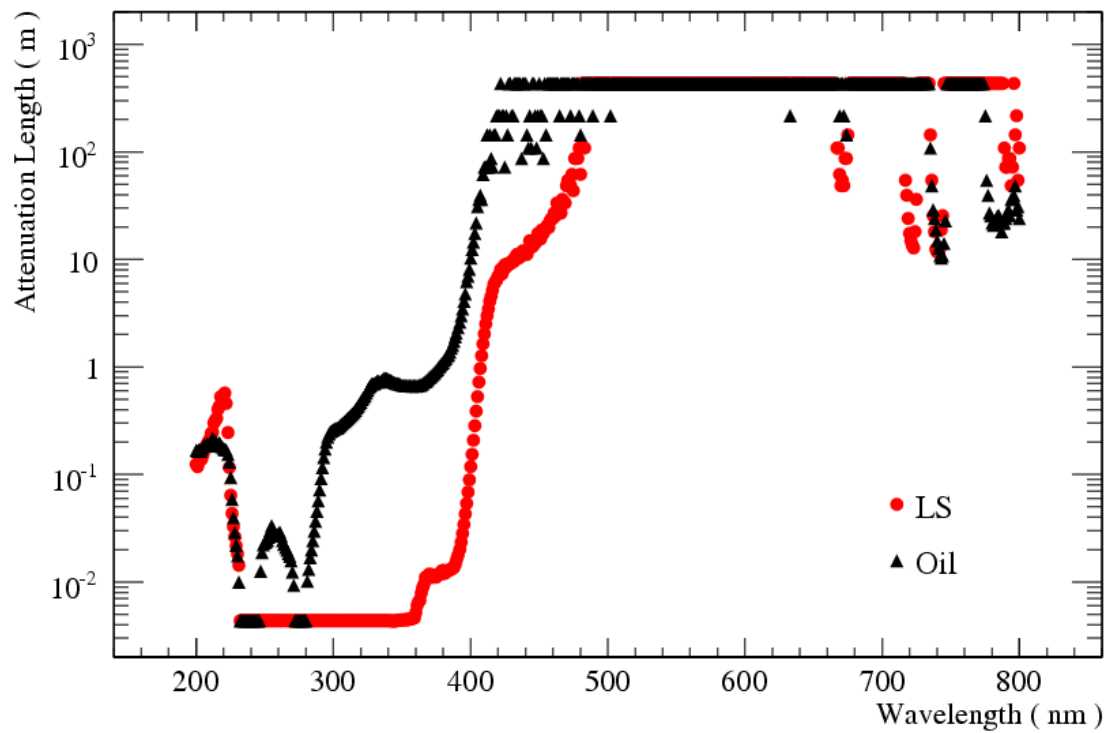
20% difference
between pe yield with
RPI PPO and Ukraine
PPO



results after normalizing to 1 m tube meas.

14% difference
between pe yield with
RPI PPO and Ukraine
PPO





attenuation
length in
G4dyb

shape better
matches these
measurements

